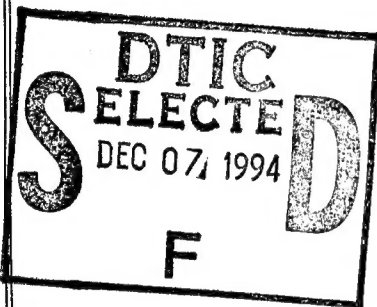


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**Strategy in the Commercial Aircraft
Industry in the United States:
A Comparison of Decisionmaking By
McDonnell-Douglas and Boeing
Aircraft Companies from 1977-1983**



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Abstract

This paper studies strategic decision making in the commercial aircraft manufacturing market. It compares the decisions made by McDonnell-Douglas Corporation with those of Boeing Aircraft Company in the late 70s and early 80s. The study concludes that strategic decisions were made based on each company's vision of its core business. McDonnell-Douglas refused to risk its capital on a new commercial aircraft because its core business was defense. Boeing, on the other hand, was willing to risk the company on new aircraft development because its core business was the commercial aircraft market.

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Table of Contents

I. Introduction.....	3
II. The Environment.....	3
III. The Players	6
IV. Opportunities and Risks	13
V. The Response.....	17
VI. The Decision	24
VI. Summary	27
Exhibit Summary	29

I. Introduction

In this study I will compare strategic decisions made by Boeing Aircraft Company and McDonnell-Douglas Aircraft Corporation (McAir) in the commercial aircraft market in the 1977 to 1983 timeframe. I hope that by contrasting the decision making in these two highly successful companies that I will derive some general principles about decision making in large corporations. To accomplish this goal, I will answer the following questions:

1. What was the environment at the time?
2. How well did each company recognize the opportunities and risks?
3. How did each company react to the opportunities?
4. What were the factors which drove the decision?

II. The Environment

First, what was the environment? The 70s was a period of unprecedented growth for the airlines. Airline traffic had been growing at 10 percent (Revenue Passenger Miles) and was forecast to continue at a growth rate of 6.9 percent through the 80s.¹ However, as the industry entered the 80s, several factors began to change this outlook and impact decisions in airlines and at Boeing and McDonnell-Douglas. **The driving factors were airline fuel costs, deregulation and new competitors in the manufacture of commercial transports.**

¹ Greenslet, E.S., Merrill-Lynch, New York, NY, AIAA-83-2504 Transport Aircraft Requirements: How much? How Soon? How to Pay?, Presented at AIAA Aircraft Design, Systems and Technology Meeting Oct 17-19, 1983, Ft. Worth, Texas, p.5

A. Fuel Costs

Fuel prices had risen steadily since 1973 following the Yom Kippur War (Exhibit 1). By 1981, fuel accounted for 40 percent of airline direct operating costs -- double the 1973 levels.² So airlines were under tremendous pressure to buy fuel efficient aircraft that would lower operating costs. In the early 70s airlines had turned to the wide body aircraft to solve the problem. The wide body aircraft offered better operating economics on a *passenger seat mile* basis. The strategy was to buy large aircraft to lower passenger seat mile costs. In theory, more passengers shared the costs of landing fees and fuel, etc. So on a per passenger basis operating costs were lower for wide body than for a narrow body aircraft. As long as passenger traffic continued to grow, this was a good assumption. Airlines predicted continuous growth. Passenger traffic in 1978 had been growing at 9 percent per year for three years and airlines were operating at 62 percent capacity.³

But in the early 80s the industry began to recognize that the growth projections were wrong. The economy was in recession and previous growth projections were invalid. Furthermore, airline profits had turned into huge losses. The result was that the airlines had too much capacity. By 1982 airlines had 27.4 percent excess available seat miles; equating to almost three million seat miles.

B. Deregulation

²Newhouse, John, The Sporty Game, p.12, Hereafter Newhouse & page number

³Flanigan, James, "McDonnell-Duglas' Cool Cautious Strategy", Forbes, Jul 24, 1978, p. 27 Hereafter, Forbes, Jul 24

Airline deregulation became a reality in 1978 in legislation known as the Airlines Deregulation Act. It was designed to provide better, cheaper service to the public through competition. In reality, deregulation drove airlines to engage in cut throat competition. They competed head to head for the same lucrative routes. At the same time they were free to drop routes that were unprofitable leaving many cities without service. This competition had two effects. First, the airlines slashed fares on the most competitive routes to keep load factors up. The fare wars resulted in reduced earnings and called into question the airline's ability to purchase new aircraft (Exhibit 2). This fact complicated Boeing and McAir decisions about whether new transports should be launched.

Secondly, because of deregulation, airlines cut costs and sought to protect market share by adopting a Hub and Spoke route structure. This new route structure meant that flights were shorter than they had been previously. Most transcontinental flights had one stop enroute. John Newhouse points out that ". . . *three fourths of all scheduled flights worldwide are of less than two hours duration and less than a thousand miles in length.*"⁴

This new route structure coupled with lagging growth in passenger traffic made the wide body aircraft costly to operate. The forces of deregulation and fuel prices then combined to favor a market for a narrow body aircraft with a capacity for 150 to 180 passengers and for a more efficient wide body with capacity for 200 to 270 passengers.⁵

C. Competition

⁴Newhouse, p.13

⁵Earlier wide body aircraft were larger. The DC-10 and L-1011 had a nominal capacity of 270-285 passengers. The B747 could seat 385 passengers. No aircraft existed in the 220 seat capacity market.

The new competitor on the scene was Airbus. Airbus was a European consortium supported by the various governments of France, England, and Germany. Airbus became a serious threat as fuel prices began to rise sharply. It had the only fuel efficient transport available on the market -- the A-300.⁶ The A-300 also fit very well into the new route structure created by deregulation. In 1975 Airbus had virtually no market acceptance. But, by the late 70s Airbus had captured about 15 percent of the world market. In fact, in 1977 Airbus was making inroads in the U.S. market for the first time. Airbus agreed to lease four A-300/B-10s to Eastern for six months at no cost. The deal was an obvious ploy by Airbus to penetrate the American market.⁷ The ploy worked. In April 1978 Eastern ordered 23 transports worth \$778 million.⁸ Eastern also took an option for an additional 25 aircraft. Airbus' competitive position continued to improved until by 1980 it had achieved 36 percent of the world market.⁹

III. The Players

A. McDonnell-Douglas

Donald W. Douglas founded Douglas Aircraft in Long Beach, California. It was the leading commercial aircraft manufacturer up through the late 50s. Douglas produced a series of propeller driven aircraft from the DC-2 to the DC-7. Its most popular aircraft was the DC-3. At the beginning of World War II, 80

⁶ Airbus actually had aircraft built but not sold -- known as "White Tails". No privately owned company could adopt such a procedure. The inventory was estimated to be worth \$1.25 billion

⁷ "Eastern Lease, New Sales Bolster Airbus", Aviation Week & Space Technology (AW & ST), June 6, 1977, p. 234

⁸ "Eastern Accepts \$778 Million Deal To Get 23 Airbuses," New York Times, Apr 7, 1978, D:1:4

⁹U.S. Civil Aviation Manufacturing Industry Panel, National Research Council, The Competitive Status of the U.S. Civil Aviation Manufacturing Industry, p. 44

percent of commercial aircraft in service were DC-3s. During the war, Douglas built over 10,000 DC-3s in various configurations for the Air Corps. But in the late 50s and early 60s Douglas decided not to pursue the jet powered commercial aircraft.¹⁰ This decision gave Boeing a lead which Douglas never recovered. Boeing developed the 707, and later the 727, capturing most of the market. Douglas attempted to catch up in this lucrative market by developing the DC-8. The effort was too little, too late. Between 1957 and 1961 Douglas sold only 47 DC-8s and lost \$53 million. During the same period Boeing earned more than \$37 million.¹¹

Still, the DC-8 had the potential to be a great success. After Donald Douglas Jr. decided to stretch the aircraft Douglas reaped a tremendous flurry of orders from the airlines. However, Douglas offered three distinct versions of the airliner, causing confusion, delays, and high production costs. Customers sued Douglas because of the late deliveries.

The Vietnam war also complicated the company's production problems by causing material shortages. Douglas began to experience cash flow problems in the mid 60s. Finally on January 13, 1967 Douglas merged with McDonnell Aircraft Corporation to form McDonnell-Douglas Aircraft Corporation (McAir).

McDonnell Aircraft was a St. Louis based defense contractor. Sanford S. McDonnell "Mr. Mac" founded and managed the company. He led the highly successful defense company for over 40 years.¹² But, in the early 60s Mr. Mac wanted to diversify so the company wouldn't be entirely dependent on government contracts. He settled on a merger with Douglas Aircraft to accomplish that goal.

¹⁰Ironically, C.R. Smith, Chairman for American Airlines, discouraged Douglas from developing a jet transport. Later, after Boeing introduced the 707, American was the first customer., Newhouse, p. 137

¹¹Newhouse, p.133

¹² In 1978 McDonnell was the nations leading defense contractor for the third year in a row. McAir was completing one of the longest production runs ever with the venerable F-4. They were also starting production of the highly successful F-15.

On the surface, the merger seemed logical. It was a friendly takeover of the ailing Douglas firm. The technologies of military and commercial aircraft production are similar if not identical. Commercial aircraft should have been a natural extension of existing business. Moreover, the commercial market could be lucrative. After development costs were amortized, each aircraft represented almost pure profit.

In practice, the merger was not completely successful. While the technologies between military and commercial aircraft were similar, the customers could not have been more different. As a defense contractor, McDonnell had to please one customer. The government absorbed most development costs and protected McDonnell from risks. Furthermore, McDonnell had leverage with the Pentagon because in most cases there was no competition. There was only one place to buy an F-4.

In the commercial market, the picture was much different. First, McDonnell had to be willing to invest huge sums of money for development up front. A company could expect to spend up to \$2 billion before the first aircraft was delivered to the customer. Even then profit wasn't certain. Because there were competing suppliers, the airlines had all the leverage in the negotiations. Mr. Mac attempted to change the relationship in early 1967. Mr. Jackson McGowen, then acting chief of Douglas described a conversation between Mr. Mac and C.R. Smith, Chairman of the Board at American Airlines. McGowen and Mr. Mac had been invited to a morning meeting to begin at 9:00 and continuing through lunch. The conversation went as follows:

Mac began with a speech about how the airlines shouldn't interfere with the specs of an airplane and shouldn't try to control the price. They should leave all that to the manufacturers. Mac also spoke about how the airlines had been victimizing the suppliers for years.

C.R. got madder and madder. At 9:10, he opened the door and thanked them for coming. Mac said, "But we had scheduled all of this morning for talks and then lunch." C.R. thanked them again for coming and that was that. It was the start of Mac's continuing effort to restructure the buyer-seller relationship. He never understood that you couldn't outmaneuver the airline in a contract negotiation the way he outmaneuvered the Pentagon.¹³

This conversation was revealing. From the very beginning, McDonnell didn't understand the customer or the circumstances driving the commercial aircraft industry. The airlines had most of the leverage as they played one manufacturer off against the other. This attitude would plague McDonnell-Douglas for many years.

McAir also had a series of experiences with the DC-10 that would cloud its subsequent view of the commercial market. In 1967 Lockheed and McDonnell-Douglas competed in the wide body aircraft market. The two companies produced aircraft that were identical in length, width, seating capacity, range, and costs. The result was a "split" market in which neither company could be profitable. American Airlines and United Airlines selected the DC-10. Eastern Delta, and Trans World Airlines (TWA) selected the Lockheed L-1011. The market was further segmented since Boeing's 747 and Airbus' A300 were both wide-body transports on the market at the time.

The decisions that caused McAir and Lockheed to compete in this "no win" competitions have been a matter of great interest.¹⁴ However, a thorough study is outside the scope of this effort. The point is that the DC-10 program entailed huge risks and losses for McAir. McAir had spent almost \$2 billion in development and

¹³Newhouse, p. 142

¹⁴Ironically, had C.R. Smith been the Chairman at American a few years later American probably would have not selected the DC-10. Instead, American became the launch customer for the DC-10; the beginning of a costly head to head market with Lockheed.

tooling for the DC-10. The market for wide-body aircraft simply was not large enough to recoup the expenses.¹⁵

Just as McAir was close to achieving the break even point on the DC-10, disaster struck. On May 25, 1979 a DC-10 crashed in Chicago killing 273 people. The engine separated from the wing on takeoff and the pilot lost control. It was the worst commercial aviation disaster in U.S. history.¹⁶ The Federal Aviation Administration (FAA) reacted by grounding the DC-10s for 37 days. This terrible tragedy seriously damaged McAir's corporate image. It lost sales even though investigators eventually found the aircraft was sound.¹⁷ McAir also delayed plans for a follow-on "stretch" of the DC-10 as a result of the disaster.¹⁸ These experiences proved to be decisive as McAir developed a Corporate strategy for the 80s in the commercial aircraft market.

B. Boeing Aircraft

William Boeing founded the company in the 1920s. The company was founded on air mail routes created by the Kelly Airmail Act of 1925. Boeing developed aircraft to support its transport business and in 1928 became a holding company that included "United" airlines, Stout airlines, Pratt & Whitney (engines), Boeing, Sikorsky, Northrop-Stearman (manufacturers), and Standard Steel Aero Manufacturing (propellers). In 1934 the government forced the company to divest its airline companies.

¹⁵McAir initially forecast a 1,200 aircraft market. Only 620 were sold between McAir and Lockheed in 14 years of production.

¹⁶Smith, Lee, "They've Turned Off the Seat-Belt Sign at McDonnell-Douglas, Fortune Magazine, Dec 17, 1979, p. 60.

¹⁷The accident had been caused by a combination of a faulty maintenance procedures and pilot error at American Airlines.

¹⁸Smith, Lee, "They've Turned Off the Seat-Belt Sign at McDonnell-Douglas, Fortune Magazine, Dec 17, 1979, p. 60.

Boeing was a manufacturer of commercial aircraft and military bombers such as the venerable B-47 and B-52. The B-52 was a significant step for Boeing because it allowed Boeing to master the technology of jet powered aircraft. In 1953, Boeing's President, William Allen, persuaded the Secretary of the Air Force, Harold Talbot, to allow Boeing to use the government owned B-52 construction facilities for the development of a new jet powered transport. This marked the beginning of Boeing's success in commercial aviation.

Boeing developed and introduced the 707 in 1958. It soon dominated the market with this aircraft. Eventually Boeing sold almost 800 aircraft. Success in the commercial market coupled with failures in the military market led Boeing to the conclusion that the U.S. Government "*was not a reliable customer for its airplanes, because of the somewhat arbitrary, if not eccentric, manner in which the winners of major military airplane programs were being chosen.*"¹⁹ Boeing had lost the competition for the FX program (later the F-16) to General Dynamics. So, in the early 60s Boeing shifted its priority to the commercial aircraft market. It followed up on the 707 success with the 727 and the 737. For a long time, the 727 proved to be the most successful program ever with over 1,800 deliveries.²⁰

However, Boeing's success story took a detour in 1966. At the urging of Pan Am, Boeing launched the 747 program. It was the first commercial wide-body aircraft and it was enormous by any standard. Boeing had to build a 783 acre plant to enclose the 747 production line.

Costs were equally staggering. The initial commitment was \$750 million -- virtually Boeing's entire net worth. Despite enormous technical challenges with the development of an engine, Boeing committed to an aggressive four year delivery schedule. Difficulties with the engine made the delivery schedule

¹⁹Newhouse, p. 23

²⁰Today, the 747 is the most successful in terms of dollars and the 737 in terms of the number of aircraft delivered.

impossible. Since Boeing couldn't deliver the aircraft on time, it had a big cash flow problem. Not only were payments not coming in, but it had to pay penalty fees for late deliveries. Boeing's position was serious. Moreover, a recession made matters worse. Boeing didn't receive a single order for 747s from 1969 through 1971 and almost went bankrupt. According to Tex Bouillioun, head of Boeing's commercial aircraft operations, they "*came within a gnat's whisker of not making it.*"²¹

Boeing survived by using a variety of strategies. It began to get control of its costs; reducing manpower in Seattle from 101,000 to 37,000. It also reorganized the production line to make tools and parts more easily available. As a result, a worker was able to spend up to 70 percent of the time at his position on the assembly line -- a three fold improvement. Boeing also instituted a new inventory control system. It found that no one had "told" the computer to quit ordering parts when 747 orders slowed down. By 1978 Boeing could produce the 747 with one quarter the manpower originally required because of the improvements in efficiency.²² Boeing got costs under control and the 747 began to sell. The market gradually expanded as new airlines were founded overseas. Many saw the 747 as a status symbol. It was the biggest and so the best aircraft available. Eventually, the 747 became Boeing's "cash cow" generating enormous profits for each aircraft sold after it had amortized its development costs.

The 747 experience changed Boeing's approach to development of future airliners. It scrupulously controlled costs. But, Boeing would also thoroughly analyze the market before committing to a program. As we will see, Boeing's

²¹Newhouse, p. 167-169

²²Boeing's efficiency sometimes got in the way of its other strategic interest. Boeing was negotiating with British Aerospace to build the 757 wing. But, British Aerospace's costs were 50 percent higher than those of Boeing. Even the best American firms had costs that were 25 percent higher than Boeing. As a result, Boeing was unable to complete the deal that would have provided much needed capital. They built the wing in-house.

response to future opportunities would be much different from that of McAir because of fundamental differences in corporate strategy.

IV. Opportunities and Risks

We now turn to the question of: **"How well McAir and Boeing recognized the opportunities and hazards presented in the commercial aircraft market?"**

I've already discussed the influence that deregulation and fuel prices had on the market. As previously noted, fuel prices and deregulation resulted in a new route structure that favored smaller more efficient aircraft -- the short to medium range transport. The aircraft would be designed to carry from 150 to 200 passengers and have a range of 1,500 to 2,000 miles. Airlines also needed a new, smaller, wide body aircraft with a 220 seat capacity for transcontinental routes. How well McAir and Boeing answered these needs would be critical to their future in the commercial aircraft market.

There were also great risks involved in launchin any new transport. And the risk didn't end once the aircraft began to sell. Boeing and McAir would have to commit the entire company (\$2 to \$4 billion) and if the planes didn't sell, each could have been facing a financial disaster. Further, the manufactureres could expect to wait four years before revenues began to flow and 12 to 15 years to realize profits (Exhibit 3). So, the airlines hold the manufacturers "hostage" playing one off against the other. The manufacturers had little choice but to slash prices and provide guarantees hoping to eventually make a profit. Boeing and McAir were also obliged to help customers with financing in most cases. These services were critical as Boeing competed with Airbus for United and TWA's business. Airbus was offering the A-310 against Boeing's 767. The airlines pitted

one against the other. United's Richard Ferris said: "*Boeing won it. . . Of course competition worked to our advantage. My job is to use one supplier against the other.*"²³ United's order was worth \$1.5 billion to Boeing. Boeing would later claim that it had lost \$1 million per aircraft on the 49 aircraft deal.²⁴

However, the leverage doesn't necessarily remain with the airlines. After the airline selected an aircraft, leverage tended to swing back in the direction of the manufacturer. The airline will usually buy more of the same plane for standardization purposes. Also, the airline is dependent on the manufacturer for supplies and services.

What, then were the opportunities? Before we consider how Boeing and McAir viewed the risks and opportunities, it is important to understand the objective view of the market at the time. In 1978, the U.S. Industrial Outlook projected a five year compound annual growth rate of 6.8 percent. It noted that 1978 sales were \$22.2 billion -- 21 percent better than expected. So, optimism was high. The principal risk to U.S. manufacturers was posed by the availability of fuel and by Airbus. The Outlook noted the "*Present inconsistencies in the identification of world petroleum reserves are a major problem for the builders as well as the buyers.*" Some experts projected that we "*only had 20 more years of economically recoverable petroleum.*"²⁵

The 1979 U. S. Industrial Outlook was even more optimistic. It projected an annual growth rate of 11.2 percent in constant dollars. Further, it projected that air transportation demand would be bouyed by "*. . .aging airline fleets, desired reduction of operating costs, and compliance with noise regulations.*" Overall, these factors were expected to result in a requirement for 1,850 large transport

²³Newhouse, p.212

²⁴Ibid.

²⁵U.S. Industrial Outlook 1978, p. 165-167

aircraft valued at \$43 billion from 1979 through 1983. Once again it noted the danger posed by fuel shortages.²⁶

A. McAir

McAir understood these risks and opportunities in that order. In 1978 McAir was wary of future ventures into the commercial market. After a decade of the bruising DC-10/L-1011 competition, McAir still had \$629 million of deferred development and tooling costs against the DC-10.²⁷ While referring to Boeing's decision to develop the 757 and 767, McAir's Chief Executive Officer (CEO), Sandy McDonnell, told Forbes Magazine *"They're (Boeing) gambling the company. If they make the wrong decision they could be in real trouble."*²⁸ McAir was more inclined to adopt a cautious strategy because of the enormous up front investment. Mr. Alan Beasuli, aerospace analyst for Drexel Burnham Lambert Inc, stated that McAir's strategy *"... is not to seek more dominance in the market but to hold share of the market at minimal cost."*²⁹

Still the opportunities were great. McAir management recognized that it had the chance to produce a replacement for the Boeing 727 to fill the "Hole in the Market" for the short to medium range market -- 150 to 200 seat and 2000 mile range. As previously noted, no aircraft then existed to meet the need and McAir estimated in 1979 that the market for this type aircraft would reach 2,000 aircraft.³⁰ McAir recognized these opportunities and wanted to compete in the business if they could avoid the risks. As we will see, avoiding the risks and remaining competitive proved impossible.

²⁶U.S. Industrial Outlook 1979, p. 301-307

²⁷Forbes, July 24, 1978, p.27

²⁸Forbes, July 24, 1978, p.27

²⁹"Where Management Style Sets the Strategy," AW & ST, Oct 23, 1978, p. 94

³⁰"McDonnell-Douglas Revives ATMR Project," AW & ST, Oct. 15 1979, p. 25

B. Boeing

Boeing seemed to reverse the opportunity/risk equation. They recognized the opportunities first and then the risks. In 1977, Boeing projected a \$36 billion, 2,000 aircraft market for short to medium range transports and a \$56 billion, 1,500 aircraft market for wide-body aircraft in the 220 to 270 seat transport.

Furthermore, Boeing's understanding of risk was fundamentally different from that of McAir. Boeing understood the inherent financial risks but displayed an unwavering confidence in its ability to compete. Boeing's primary concern was the challenge from Airbus in the U.S. market. With respect to demand, Boeing was projecting annual passenger traffic growth between 4.5 to 7.1 percent. But, there was some doubt within the industry whether the airlines were financially able to buy enough aircraft to justify the new programs (7N7 and 7X7).³¹ Boeing's Director of market research said that despite the favorable market forecast that an "X event" could scramble the picture. By this he meant that any event that might trigger steeply rising fuel costs.

The A-300 was a direct competitor of the 7N7 and so posed a threat to Boeing's market share. However, the question wasn't ever whether to compete. Instead Boeing was interested in how to keep Airbus out of the market. The alternative for Boeing was to be out of business altogether.

³¹The 7N7 would later become the 757. The 7X7 became the 767.

V. The Response

First it is necessary to understand that both McAir and Boeing made critical decisions in the 1978 to 1980 timeframe. Both companies were developing designs for a medium range narrow body aircraft and for the larger 200 passenger wide body transport. There would be subsequent efforts to launch follow on transports. But, the decisions taken in late 1978 through early 1980 would determine which transport would get to market first -- or whether it would be launched at all.

A. McAir

How did McAir react? It had two alternatives if it wanted to stay in the market. McAir could either launch an entirely new aircraft with an investment that might reach \$2 billion or it could modify an existing aircraft and improve its performance with an outlay that was estimated to be between \$200 to \$500 million. At the time it had over \$1 billion in shareholder's equity, \$500 million in cash, and only \$79 million in long term debt.³² So McAir had the capability to make the commitment if it chose. McAir decided, in 1978, to invest \$200 million to upgrade the DC-9 to the 135 passenger DC-9 "Super 80" -- later the MD-80. The Super 80 was a quiet, fuel efficient version of the DC-9 and it was also the first aircraft to offer a two pilot crew configuration. Yet, John Newhouse pointed

³²Forbes, July 24, 1978, p.27

out in his book, The Sporty Game, that the Super 80 ". . . is dated and not likely to compete against the Boeing family."³³

Simultaneously, McAir was developing the Advanced Medium to Short Range (AMSR) project with a European consortium.³⁴ The ASMR was to be a modified version of the Mercure 100. It was to carry 160-180 passengers and have a range of 2,000 nautical miles (nm). In addition, McAir was scaling down the DC-10 to build a 220 passenger transport -- the DC-X-200. But by July of 1978, McAir had scrapped both efforts. In describing the decision Sandy McDonnell said: "*We intend to stay in the commercial aircraft business. But, this is a high mortality business.*"³⁵ He went on to argue that by the time the new transport was delivered, that airlines would need an aircraft closer in size to the DC-10. Furthermore, he asserted that Boeing and Airbus had not incorporated important advances in technology to their aircraft.³⁶

Fifteen months later (October 1979) McAir announced that it intended to re-enter the market. However, this time McAir proposed an entirely new aircraft - not a derivative. It was called the Advanced Technology Medium Range (ATMR) transport.³⁷ The ATMR was to be a twin engine aircraft with seating for 160 to 200 passengers. It would have two aisles making it unique compared with Boeing's design for the 7N7. As previously mentioned, McAir foresaw a market for up to 2,000 aircraft through 1994. McAir executives told Aviation Week & Space technology that ". . . the current deregulation environment and rising fuel prices were among the factors behind the renewed interest in the project."³⁸ On the one hand, this assertion is easy to understand. In 1979, fuel price increases

³³Newhouse, p. 26

³⁴"Transport Designs Taking Shape", AW & ST, March 21, 1977, p. 141.

³⁵Forbes, July 24, 1978, p. 28 & 94

³⁶Ibid, p. 94

³⁷Later the ATMR became the DC-11

³⁸AW & ST, October 15, 1979, p. 25

were again accelerating as the U.S. experienced its second "oil crisis (Exhibit 1)." As oil prices continued to rise rapidly, airlines were under increasing pressure to buy new fuel efficient transports. On the other hand, rising prices made airlines less able to finance new equipment. This fact, combined with the uncertainty created by deregulation, made demand forecasting risky.

So, one should not be too surprised that McAir decided to cancel the ATMR in favor of the Defense Department CX program three months later (January 1980).³⁹ The CX program was the competition for the development of a new military transport.⁴⁰ Mr. John C. Brizendine, then President of Douglas, told Aviation Week and Space Technology: *"In no way does this deemphasize our commitment to the civil transport side of the business. This is a short term, full energy effort to capture companion work on the military side that would be complementary to our civil projects."*⁴¹ McAir had decided to forego development of a new transport in the civil market to compete in what it hoped would be a more profitable military market. However, McAir's stated commitment to the civil market rang hollow. It had backed away from competition in most of the civil markets at a crucial point. Further, its indecisive approach to the transport market made customers wary of McAir's true intent (Exhibit 4). It was left with an unimproved DC-10 and an upgraded DC-9; the "Super 80." McAir had no other aircraft to offer customers and very little to back up its commitment to stay in the civil aviation market.

Its decision on the ATMR was especially difficult in light of the interest shown in the plane by Delta Airlines. Delta actually preferred the ATMR/DC-11 to the Boeing 757. Delta wanted to keep McAir in the commercial market to avert a Boeing monopoly. Delta had offered to buy 60 planes as the launch customer.

³⁹"McDonnell-Douglas Halts ATMR Work", AW & ST, Jan 7, 1980, p.16.

⁴⁰Later the CX became the C-17 program

⁴¹AW &ST, January 7, 1980, p. 16

But McAir wanted *"fat progress payments to help cash flow as Delta's 60 planes moved through production."* Robert Oppenlander, senior vice-president of Delta complained: *"They wanted to launch a new plane without taking any risk." That ain't the way it works.*"⁴²

McAir demanded at least two launch customers before commitment. Sandy McDonnell stated they wanted a *"clear airline consensus on what is really needed."* It seemed that the "consensus" McAir wanted was a guarantee of profitability. Its primary goal was to find a market niche and avoid head to head competition like that of the DC-10/L-1011. This objective would be difficult to achieve considering the full line of aircraft offered by Boeing and the increasing competition from Airbus. Furthermore, McAir had asked its suppliers to assume development risk.⁴³ McAir was asking suppliers to accept risk but offered little in return. In a market where price slashing was a certainty, supplier revenues could evaporate quickly as McAir cut prices to win deals with the airlines. In the end, McAir lost a chance at a \$3 billion aircraft deal with Delta and a place in the market.

Delta's buy was significant because other airlines were now under pressure to buy the 757. Otherwise, according to AW &ST *"... they could lose critical delivery positions on an essential type of plane that Boeing alone may build."*⁴⁴ Even American Airlines was interested in the DC-11 despite animosity between the two companies over the DC-10 crash. American's President Albert V. Casey commented: *"Lord knows, we want McDonnell-Douglas to stay in the business."*⁴⁵ So, the opportunity was there. McAir chose to close the door in favor of a "safer" strategy.

⁴²"The Big Deal McDonnell-Douglas Turned Down," Business Week, Dec 1, 1980, p.81.

⁴³ Ibid., p.81

⁴⁴Ibid, p.81

⁴⁵Ibid, p.81

McAir apparently decided the time had come in 1981. Despite a recession, it began development work on a series of new and derivative planes. It was developing the MD-90 (a DC-9 derivative) for the short range 100 to 120 seat market. It intended to offer the new D-3300 for 150 seat market and the MD-100 (a DC-10 derivative) in the wide-body tri-jet transport market. In June of 1983 James E. Worsham, President of Douglas Aircraft Company, outlined these new efforts by McAir. Mr. Worsham expected to compete for 5,500 new aircraft that the airlines were forecast to need by the year 2000.⁴⁶

The MD-100 was to be the corner stone of McAir's strategy. Its various derivatives were to have seating capacities for 270 to 400 passengers. McAir promised 57 percent better operating costs than the 747. It had incorporated important technology improvements in wing and structural design that gave it a significant advantage in fuel efficiency over existing wide-body tri-jets; including the DC-10. McAir stated in October 1983 that it needed 20 firm orders to launch the effort.⁴⁷ Yet by November of 1983, McAir cancelled all these new programs and released 1,000 workers.⁴⁸ A strike at the Long Beach plant by the United Auto Workers (UAW) union employees had triggered a management review of McAir's development efforts. Company officials told Aviation Week that there "*... was a lot of wariness about what the future holds in that (commercial transport) market. Management was not so upset about what has happened in the past as it is lacking confidence in what the market is going to do in the future.*"⁴⁹ McAir had good reason to be wary. It had set a target for 20 firm orders but had received few. Also, unlike the ATMR project, McAir was now far behind Boeing and Airbus in the market. Boeing was already delivering 757s and 767s. Airbus

⁴⁶"McDonnell-Douglas Designing Four Derivative Transports," AW & ST, June 27, 1983, p.32.

⁴⁷"Widebody trijets: Have they a future?", Interavia, Oct 83, p. 1117-1119

⁴⁸"McDonnell Douglas Laying Off Workers", AW & ST, Dec 12 1983, p.24

⁴⁹"McDonnell Douglas Halts Transport", AW & ST, Nov 21, 1983, p.14-15

fielded its A-320 and A-300/B10. So, the market was crowded. The MD-100 was an improvement, but not significant enough to force its way into the market and achieve an assured profitability.

B. Boeing

Boeing's overall strategy was to develop a family of transports to cover the entire market (Exhibit 5). This approach yielded not one but two simultaneous developments beginning in 1976. Boeing labeled these two aircraft the 7N7 (757) and the 7X7 (767). The 7N7 was a twin jet transport aimed at the 150 to 180 seat market. It was a derivative of the 727. It used the 727 fuselage with an improved wing and had two wing mounted engines. Boeing projected 18 to 20 percent improvement in direct operating costs over the 727. Most of the improvement came in the form of better fuel efficiency.

Simultaneously, Boeing began development of the 7X7. This was a wide-body twin jet aircraft with a 200-220 passenger capacity. It was an entirely new aircraft; not a derivative. Boeing projected up to 35 percent improvement in fuel efficiency for the 767 over the DC-10 and L-1011. The simultaneous development of the two aircraft meant that Boeing had committed to \$2.5 to \$3 billion in development costs. Once again, Boeing was placing the entire company at risk. They were "betting the company."

Boeing made the commitment and confidently marched onward. Its development strategy was to achieve as much commonality on the two aircraft as possible. By July of 1981, Boeing rolled out the first 767. Seventeen airlines had

firm orders for 170 planes by that time.⁵⁰ Six months later the 757 rolled out on time with 136 firm orders.⁵¹ The bet was paying off.

Further, in 1981 Boeing decided to change the 767 to a two-pilot configuration to reduce costs for its customers. This decision required Boeing to modify the first 30 production aircraft before delivery to the customer. Boeing removed old equipment and installed a new Engine Indication and Crew Alerting System (EICAS) after the transport came off the production line.⁵² It also had to fly an additional 100 hours of flight test while the 757 flight test was in progress. Boeing had taken the decision because the Government had granted approval for the two pilot configuration. Previously, airline pilots had protested the move to this configuration based on safety considerations. However a Presidential commission decided to allow the two pilot configuration clearing the way for manufacturers and airlines.⁵³

Yet at the same time, Boeing was busy improving a whole family of planes in addition to the 757 and 767. For example, it upgraded the 737-200. Boeing improved range and efficiency in the 737-200 by incorporating lighter materials developed for the 757/767. In addition, it re-engined the 737-200 for better thrust and fuel efficiency. It also offered the 737-300. The 737-300 was a 130-140 seat derivative of the 115 seat 737-200. In addition, Boeing introduced the ultra long range 747SP; a 600 passenger version with longer range than the original aircraft. Boeing also incorporated new engines and a flight management system to improve fuel performance on the 747SP. So, Boeing was busy developing a full line of large transport aircraft. It could claim 60 percent of the world market and continued to offer transports to fit any need.

⁵⁰Roberts, Larry. Boeing Rolls Out First Fuel Efficient 767 Jetliner, UPI, Aug 4, 1981

⁵¹Koza, Patrick. Boeing Rolls Out 757 Jetliner, UPI, Jan 14 1982

⁵²"Boeing Aircraft Project Moves Forward," AW & ST, Nov 9, 1981, p.117.

⁵³AW & ST, July 6, 1981, p. 26

VI. The Decision

A. McAir

To evaluate McAir's decisions one must first answer several questions. Did McAir recognize the opportunity? Previous discussion has already established the fact that they recognized not one but several opportunities? Second, did McAir have the ability to respond? In this case McAir had the facilities, the expertise, and the cash to make the commitment. As previously noted, during the critical 1978 time period McAir had \$1 billion in shareholders' equity, \$500 million in cash and only \$79 million in long term debt. But there were other pressures on McAir from Wall Street.

McAir was caught in a paradox between long run versus short run objectives. In the long run, McAir needed to develop the ATMR/DC-11 to remain competitive in the commercial market. But, in the short run, Wall Street was advising against the DC-11. One analyst, referring to the cancellation decision said: *"If they (McAir) decide to build the DC-11 you'll never see the stock go down so fast as theirs will."*⁵⁴ Still, McAir could have overcome the pressures from Wall Street. Yet, it is not really surprising that McAir refused to make a commitment involving its entire net worth for a venture that had a dubious rate of return on equity and a payback period of twelve to fourteen years. Even if, McAir managed to capture 40 percent of a 2,000 aircraft market, it could only expect to just break even on the project.

⁵⁴Business Week, Dec 1, 1980, p. 81

We must also view McAir's reluctance in a historical context. Its first experience in the commercial market was the DC-10. McAir entered the competition in an overcrowded market and experienced big losses. Just when it was close to the break-even point, the DC-10 crash occurred in Chicago. The crash resulted in further loss of profits and damage to the corporate image. Furthermore, the commercial aircraft business had never been profitable for McAir. It had reported losses in its commercial business in every year since the merger. There was very little incentive for McAir to risk the company in what it saw as a still overcrowded commercial market.

However, one of the most important factors in McAir's decision(s) was that it is first a highly successful defense firm. In 1978 McAir received three quarters of its revenues from government business. And despite a 1978 \$49.6 million loss on commercial aircraft, McAir netted \$123 million in earnings. McAir would have to be willing to risk the entire firm to launch the \$2 billion effort.

Clearly, McAir wasn't willing to take that risk. Sandy McDonnell "shudders" at the magnitude of Boeing's venture with the 757 and 767: *"They're gambling the company. If they make the wrong decision they could be in real trouble."*⁵⁵ Mr. Mac was the driving force behind McAir's conservative approach to commercial aircraft. Business Week points out: *"In few, if any companies its size has a single man's influence been so pervasive. In style and tone McDonnell Douglas directly mirrors Mr. Mac's personal characteristics."*⁵⁶ John McDonnell, Executive Vice President and chief financial officer (and son of Mr. Mac) said that: *"The management style at McDonnell-Douglas is the strategy. Measuring every risk carefully, being highly conservative, and being dedicated to technical approaches produce a strategy. . . Right away, you rule out a lot of*

⁵⁵Forbes, Jul 24, 1978, p. 27

⁵⁶Business Week, Oct 23, 1978 p.89

*strategies because they don't fit the character."*⁵⁷ **McAir's style is conservative, frugal, and analytical. Its core business was defense and it was unwilling to risk that business for a costly venture in the commercial transport market. It was unwilling to make the commitment because commercial work only complemented its core company business.**

B. Boeing

It is now self evident that Boeing recognized the opportunities and had the ability to take advantage of them. It developed the 757 and 767 simultaneously; something thought impossible by industry analysts. It also continued to improve existing aircraft. Why did Boeing continue to risk the company time after time? Why was it able to take advantage of the market while McAir was victimized by it? One must also look at Boeing's decision through a historical perspective. It had decided in 1967 that its core business was commercial aircraft. It had early successes with the 707 and 727 programs. It then faltered on the 747 and came close to bankruptcy. Yet, the failure had turned into success and the 747 became a big profit maker for Boeing. Its commitment to developing a full line of aircraft had reaped Boeing 60 percent of the world wide market. In contrast to McAir, Boeing had experienced success and profitability in the commercial transport market.

However a more important explanation is that Boeing's strategic view was that its core business was building large commercial transports. As a result, it was willing to take the risks necessary to stay in the business. This strategic vision made it possible for Boeing to take the long term view. It

⁵⁷Business Week, Oct 23, 1978 p.89

surely experienced the same pressures from Wall Street, but was able to cope with those pressures because of its commitment to the industry.

VI. Summary

It is true that both McAir and Boeing saw the opportunities and risks presented in the commercial transport market. Each responded according to its strategic vision. Each company's vision gave it a different assessment and tolerance to the risks as compared with the opportunities. McAir's strategic vision was that of a Defense company that had diversified into the commercial market. McAir, made most of its profits from Defense related business. At first it was willing to take risks. It invested heavily in the DC-10 and had failed to become profitable. Against this background, it refused to risk its entire net worth to develop a new transport in the late 70s and early 80s. As a result, its market share would eventually shrink from 25 percent to 15 percent. Boeing, on the other hand, was primarily a commercial aircraft manufacturer. Obviously, Boeing had a much higher tolerance for risk. Moreover, it had also learned from past errors. It learned to control costs and analyze the market. Once it completed these two tasks, it had the confidence to risk the company to stay in the market. Boeing would retain most of its 60 percent market share and continue to be the world's leader in the commercial transport market.

Perhaps the strategic vision of these two companies was the result of the paths each took in the past. Boeing had committed to the commercial aircraft market as early as the 1950s when it leapfrogged Douglas with the 707 jet transport. Douglas was late coming to the jet transport business and then was forced into merger with McDonnell Aircraft because of its financial difficulties.

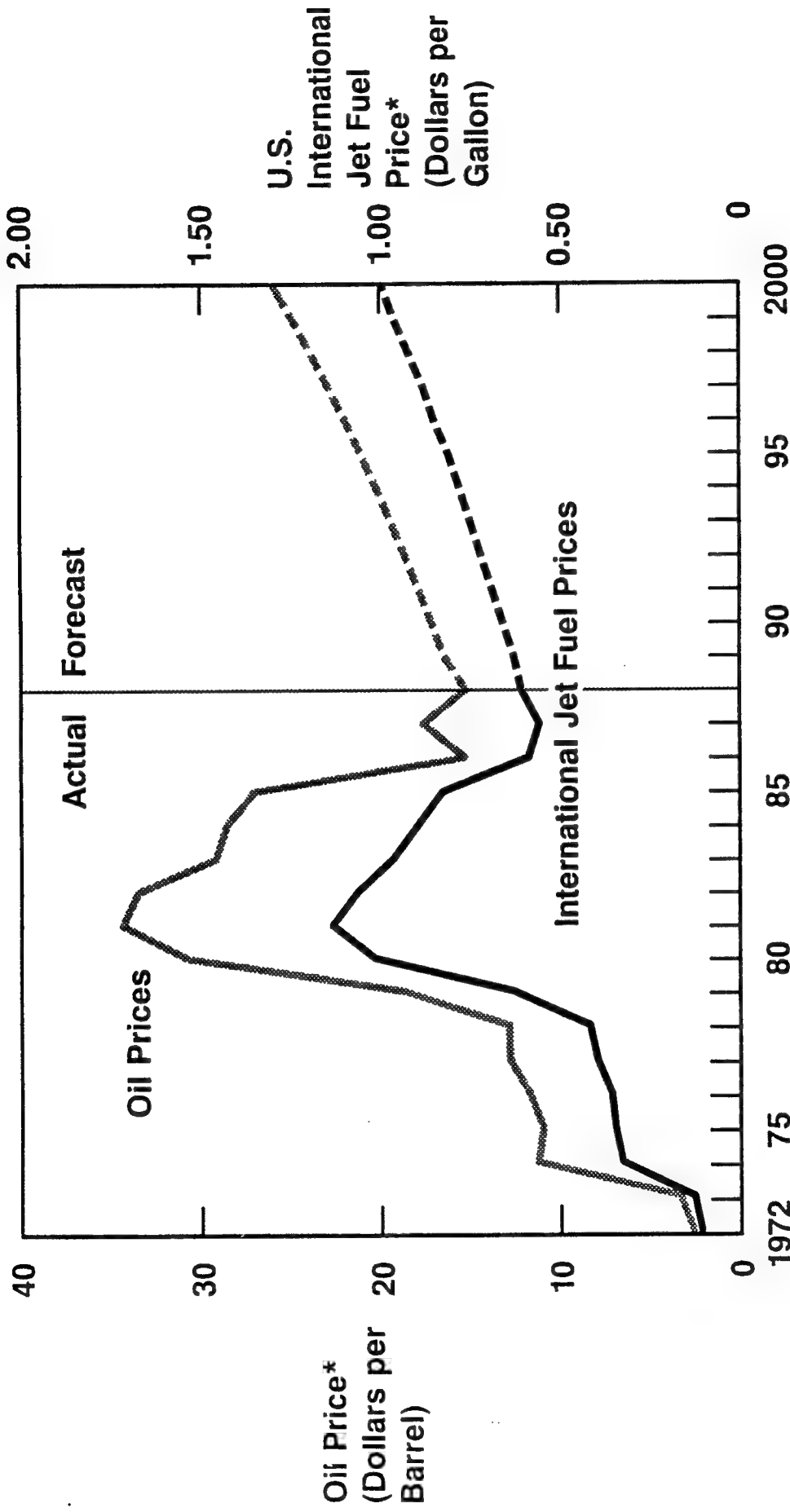
McDonnell's vision was unsuited for the commercial market. Given its vision, McDonnell's reluctance to risk the company on commercial ventures seems rational. We can thus conclude that strategic decisions (involving economic risk) may be conditioned by the historical path of the company, its vision of its core business, and its willingness to tolerate risk.

Exhibit Summary

Exhibit	Title
1	Fuel and Oil Prices
2	Major Airline Profits 1960-1985
3	Cumulative Cash Flow for an Aircraft Project
4	McDonnell-Douglas Commercial Aircraft
5	Boeing Commercial Aircraft

Exhibit 1

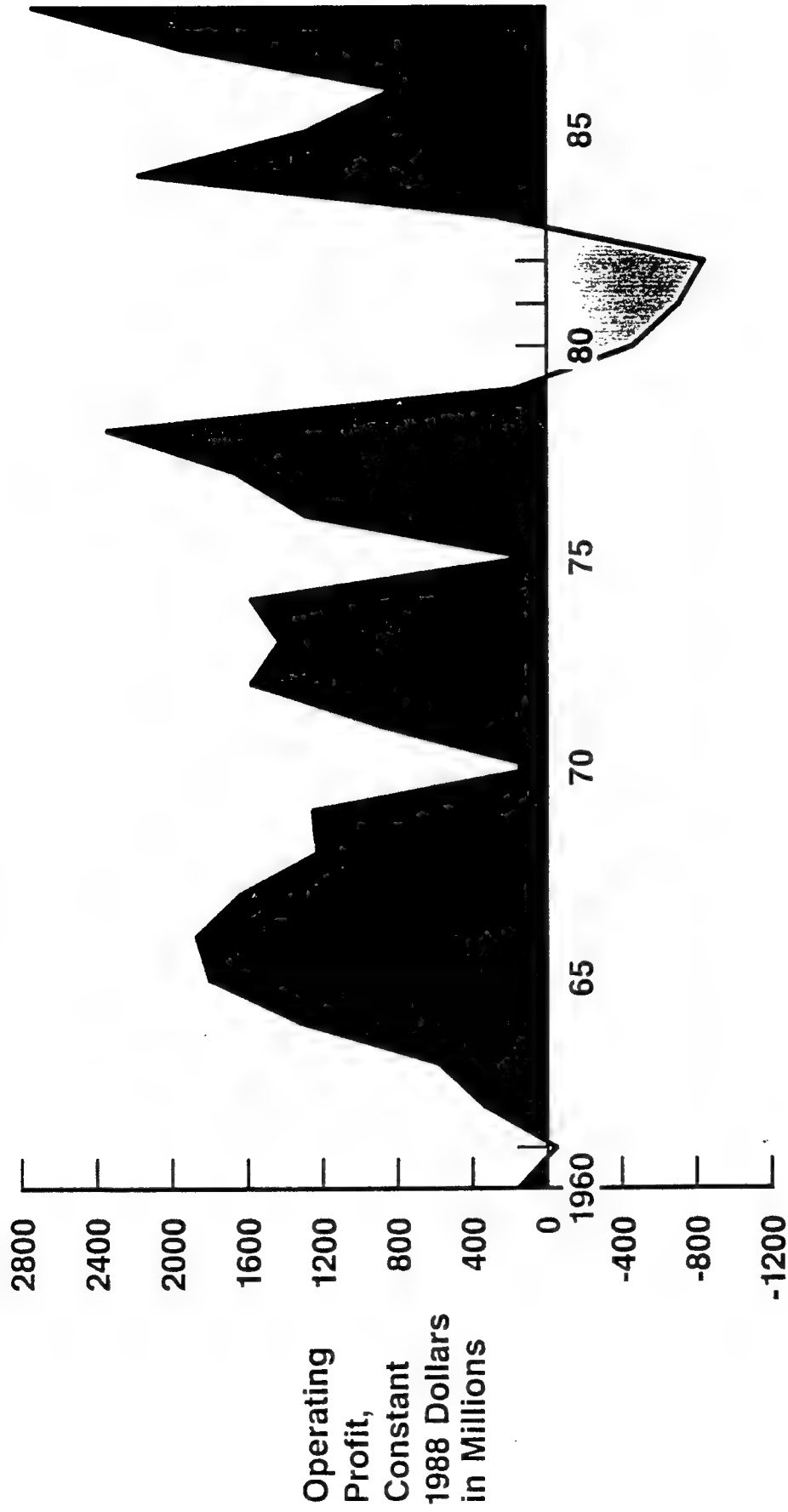
Fuel and Oil Prices



*Current dollar terms

Exhibit 2

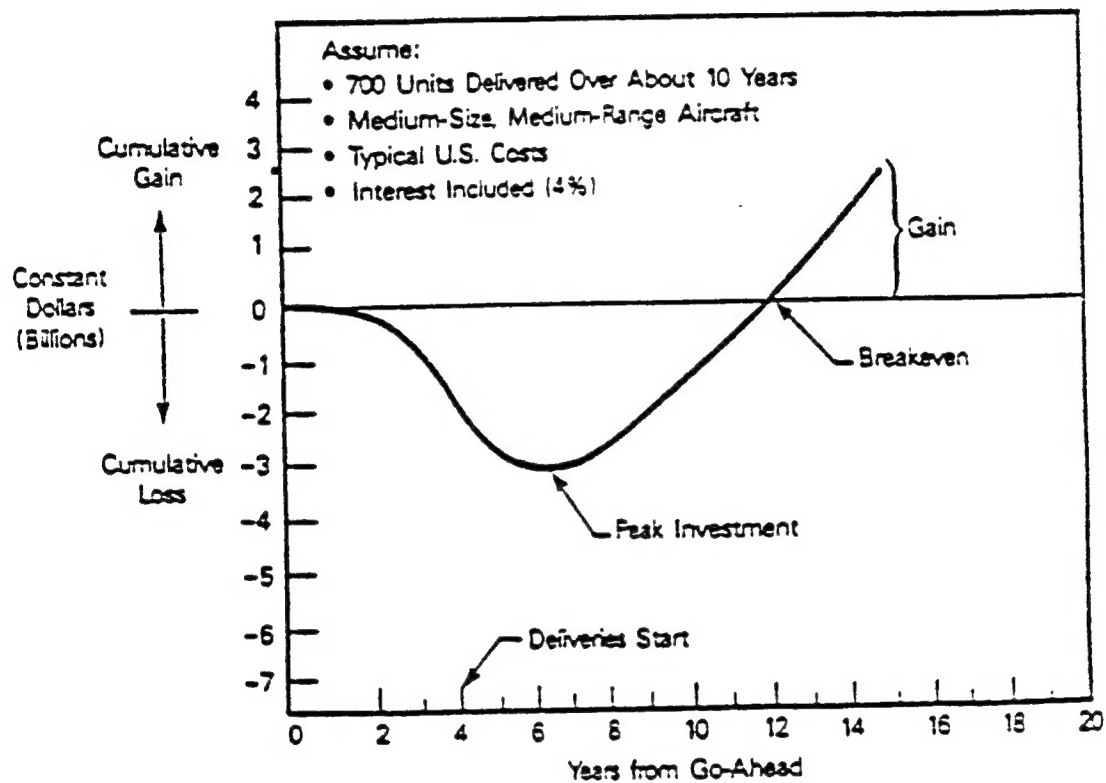
U.S. Major Airline Profit



Source: CAB Form 41

Exhibit 3

Cumulative Cash Flow for an Commercial Aircraft Project



Source: Boeing Commercial Airplane Company

Exhibit 4 **McDonnell-Douglas Aircraft**

Aircraft	Pass. Capacity		1977	1978	1979	1980	1981	1982	1983
DC-8-20	116-170	P	P	P	P	P	P	P	P
DC-8 Super 60	259	P	P	P	P	P	P	P	P
DC-9 Super 80	167	P	P	P	P	P	P	P	P
DC-10	270	P	P	P	P	P	P	P	P
AMSR	150	D	C						
DC-X-200	220	D/C							
ATMR /DC-11	150			D	C				
MD-80	135	P	P	P	P	P	P	P	P
MD-100	270						D		C
D-3300	150						D		C
	P=		D=				C=		
	PRODUCTION		DEVELOPMENT				CANCELLED		

Exhibit 5

Boeing Commercial Aircraft

Aircraft	Pass. Capacity		Boeing Airplanes 1977-1983						
			1977	1978	1979	1980	1981	1982	1983
B727-200	135-189	P	P	P	P	P	P	P	P
B737-200	115-130	P	P	P	P	P	P	P	P
B737-300	135-148			D	D	P	P	P	P
B747-200	440	P	P	P	P	P	P	P	P
B747SP	321	P	P	P	P	P	P	P	P
B757-200	180		D	D	D	D	P	P	P
B767-200	220		D	D	D	D	P	P	P
P=			D=				C=		
PRODUCTION			DEVELOPMENT				CANCELLED		